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ABSTRACT

Results of a case study of an exhibit of art and artifacts designed for children are presented. The focus of the study was to apply the principles of instructional-message design to the evaluation of the exhibit. The exhibit, "Art Inside Out: Exploring Art and Culture through Time," was displayed at the Art Institute of Chicago. Textual elements, identification games, videos, art-related computer games, and contextual environments were studied through: observation of visitors; interviews with the curator, staff, and visitors; and analysis of the text and components that make up the exhibit. It is suggested that museum professionals have ignored fundamental human information-processing principles having to do with perception, framing, prerequisite knowledge, short-term memory, drawing inferences, and making meaning. Recommendations are made for improving the overall educational quality of exhibits. They are as follows: new exhibits should have broad general goals, with specific behavioral objectives; evaluation should be an integral part of the development process; and artifacts and works of art in the exhibit should be chosen for their ability to convey the objectives of the exhibit. (Contains 2 references.) (SLD)

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Title:

A Major Children's Educational Art Exhibit: An Evaluative Case Study

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Introduction

This paper examines the results of a case study of an exhibit of art and artifacts designed for children. The exhibit was well funded by several sponsors and housed in a major national art institute. While museums tend to market their exhibits as "educational," they tend not to acknowledge them as "instructional." The focus of the case study was to attempt to apply the principles of instructional message design (Fleming & Levie, 1978, 1993) to the evaluation of the exhibit. What follows is a description of the exhibit viewed critically from the perspective of these instructional design principles.

The exhibit is at the Art Institute of Chicago in the Kraft General Foods Education Center. The Art Institute of Chicago is a large, well-known art museum. It is famous for its excellent collections, particularly its collection of French impressionist paintings, its fine physical facilities, and its prime location in "The Loop" in downtown Chicago. For many years, the museum had a facility for children known as the Junior Museum which was housed in the basement of the museum. The Junior Museum closed in 1990 for an extensive remodeling, and reopened in October of 1992 as the Kraft General Foods Education Center. The new "Education Center" is an excellent facility with a large area for orientations and mural projects, an auditorium, two large studios for student and family workshops, offices for docent and education staff, a teacher resource center, a family storytelling room, a "hallway" gallery, and exhibit preparation area, and a large area for exhibits that change periodically. This exhibition area is titled the Sol and Celia Hammerman Gallery. This exhibition space measures approximately forty by sixty-five feet. The overall Education Center is large, attractive, spacious, nicely designed; the ambiance of the Education Center belies the fact that it is in the basement of the Art Institute.

The inaugural exhibit in the Hammerman Gallery is titled ***Art Inside Out: Exploring Art and Culture Through Time***. This exhibit is the subject of the case study reported here. The exhibit opened in October of 1992 and runs through October of 1994. The exhibit was in preparation for approximately two years. The cost of the exhibit was nearly $250,000. The funding was provided by the Chicago Community Trust, the National Endowment for the Arts and the Dr. School Foundation. It should be noted that as a condition for providing funding for the *Art Inside Out* exhibit, contributors specified that "major" works of art be included in the exhibit.

While the case study examined all aspects of the exhibit, the current paper will present a sampling of the various components. Included will be textual elements, identification games, videos, art-related computer games and contextual environments that had been created to elaborate the major artifacts included in the exhibit. Selected components of one of these contextual environments was examined in depth to provide a more holistic look at how some of the principles work in tandem to shed light on the quality of an exhibit.

Methods Used in the Study

The research methods used in this case study include observations of visitors to the exhibit, interviews with the curator, other museum staff, and visitors to the exhibit, and analysis of all text and components that make up the exhibit. One of the interviews of museum visitors was with a curator from an Israeli children's museum. The observations and analysis of exhibit components comprise the major data base of this case study.

The interviews with the curator and other museum staff provide useful and interesting insight into the hopes and intentions they had for the exhibit, but the actual exhibit has to be judged upon what comprises the displays the visitor encounters. Interviews with visitors also yielded interesting comments, but in general this avenue of investigation reflected the cursory and superficial involvement of many visitors with this exhibit. Observations of visitors yielded a number of valuable insights into the workings of the exhibit. Observations conducted at different times of day or different times of year yielded vastly different results. Likewise careful analysis of the exhibit components and textual elements provided many valuable insights; this analysis would appear to explain much of the lack of visitor involvement with the exhibit. Touring the exhibit with a curator from another children's museum confirmed many of the observations and analysis.

What the Exhibit Designers Were Trying To Accomplish

A brochure prepared for the opening of the Kraft General Foods Education Center describes *Art Inside Out* as presenting "12 works of art from the African, ancient American, European, and 20th-century art collections within a museum environment, surrounded by alcoves exploring the origin of six of these objects through learning games, interactive computers / videos, and music." The curator of the exhibit and other staff who worked on the exhibit described the "objectives" of the exhibit as an attempt to present a cross-section of the museum's collections as an introduction for children and other visitors not familiar with the museum. The exhibit was also to address the question of cultural diversity in an "experimental and interactive environment." "Experimental" was defined as using presentation techniques not typical of the Art Institute of Chicago.

The experimental nature of the exhibit is derived from the exhibit's division into the "Inside" section which displays the artifacts and the "Outside" section which elaborates on the artifacts to place them in a richer context than is usually done in art museum exhibits. This elaboration is accomplished with contextual environments for six of the artifacts and an interactive, art-related, computer game that deals with six of the other artifacts. (There were originally 12 artifacts in the exhibit, but one was stolen.) A "calendar" brochure for the Art Institute states, "This installation will be enriched by an interactive environment – involving a mix of computers, video, games, and music – that will help visitors to more fully understand and appreciate art from around the world." The brochure says that the exhibit is designed to explore the point that "the meaning of an object in its original context often may vary from that evoked in a museum gallery."

Brief Overview of the Exhibit

When a visitor enters the exhibit, they are in an area with explanatory text panels and several illustrations to their immediate left, three computer stations are to their immediate right, and straight ahead are several slit-like windows through the partition which sets off this area from the rest of the exhibit. These window slits allow a view into the central gallery hall of this exhibition space – the "Inside" section – where the 11 remaining artifacts displayed in the exhibit are mounted. At this point the visitor is faced with the decision to turn left or right in order to go around this partition. The presence of the text provides a minimal cue that a visitor should turn to his or her left, read the text panels and then proceed around the partition to enter the "Inside" gallery hall. However, there is no explicit direction that a visitor should do so. Visitors were observed proceeding around the right side of the partition, thereby missing the explanatory text, the only advance organizer for the exhibit . Thus the designers fail to establish a perceptual set for some of the visitors to the

exhibit. They miss an opportunity to assist visitors with selective perception and to help them interpret what they are about to see.

If the visitor proceeds to his/her left and reads the text panels, they would be walking around the partition and into the main gallery-like section of the exhibition. This gallery runs away from and perpendicular to the partition with the slit-like windows mentioned above. In this gallery the 11 artifacts are displayed much like they would have been displayed in the other public galleries in the Art Institute. The paintings are mounted on walls, while a vase, sculptures, and a large oval dish are in plastic vitrines (Plexiglas display cases) on pedestals; one large sculpture is free-standing on a platform in the center of the room. The lighting is low key and each artifact is accompanied by a label giving the title of the piece, the artist (or creators), medium, place of origin and date, as well as the acquisition information for that art work.

However, the setup of this gallery is somewhat different from what visitors might expect to experience in the other galleries of the museum because the artwork is mounted at a lower than normal height. In addition, each artwork has a second label which asks several questions related to the artifact. These differences might be seen as concessions to children, in particular the mounting of the artwork at a more child-friendly height. The artworks housed in this gallery include a Greek bell krater vase; a Chinese grave guardian beast; a Mayan royal emblem stone; an Italian Renaissance painting; a large, Italian, ceramic, oval dish; a Japanese, wood block print; a French Impressionist painting; an African, carved wooden mask; an American, abstract sculpture; a modern abstract painting; and an American, constructed, wood sculpture. (A small, gold, Coclé armadillo pendant had been the twelfth artifact, but, as previously noted, it was stolen.)

Adjacent to this gallery hall are six alcoves, or contextual environments. Three environments are located off of each side of the gallery. Each environment provides additional information or a context for one of the artifacts in the exhibit. In many cases there is no overt connection drawn between the artifact which inspired a contextual environment and the information or constructions displayed in the environment. In other words, the principles that facilitate the perception of unity – such as proximity and inclusion – have not been applied. As a result, the visitor fails to perceive the relationship between the artifact and the contextual material and the goal of providing greater understanding and, therefore, appreciation of the artifact is thwarted.

After the visitor has toured this gallery hall and visited the contextual environments which might have interested them, they would logically proceed out of the gallery by walking around the other side of the slotted partition which they had come around to enter the gallery. In so doing, they would pass two visitor comment books, which solicit opinions about the exhibit, a series of questions about art and museums displayed on the wall, and three touch-screen, computer terminals, each of which has the same compliment of art-related, computer games. These art-related, computer games provide more context for the five artifacts in the exhibit (and the missing armadillo pendant) which were not accompanied by contextual environments.

Representative Sample Exhibit Components

Perhaps the best way to provide an overall impression of the exhibit is to discuss representative samples of each of the exhibit components. Many of the same problems appear over and over again in the exhibit. When this overall impression has been conveyed,

an in depth examination of one of the contextual environments will integrate these separate pieces into one salient picture of this exhibit and its difficulties.

The Use of Textual Elements

The textual elements used in this exhibit play a more central role than the text used in many art exhibits. There is both more text than is usually found in an art museum exhibit, and the text takes very prominent positions in the design of the exhibit. The choices of typeface, font size, ink color and background colors are consonant with principles of figure/ground, legibility, and typeface selection. Instead of the diminutive light gray print on a dark gray background found in some exhibits, much of the text used in the exhibit is a large typeface in solid black on plain white backgrounds. Both the size and the readability of this type are positive aspects of the overall exhibit. Unfortunately, the exhibit also makes an attempt to use smaller sizes of type to differentiate levels of meaning in many of the textual elements of the exhibit. This strategy is not successful as there is no discernible reason or logic for it. Perception principles indicate that the reader's attention will be drawn to the change in stimulation, yet he/she cannot make meaning of it. It is an apparent cue with no significance.

Other problems with textual elements are poor writing and the use of a number of icons dispersed throughout the text in the exhibit. With regard to the first problem, the writing is frequently not well organized, not always accurate, does not convey the information necessary to understand the exhibit, assumes too much requisite knowledge, is not designed to lead the visitor through the text in a logical order, and is studded with mistakes of grammar, spelling, capitalization, and punctuation. The second problem presents an illustration of a non-research based use of icons interspersed in text. It also presents an example of how the collaborative nature of exhibit development allows persons, such as graphic designers, to insert elements into exhibits for decorative purposes or, as in this case, because they were thought to be "fun."

The use of these icons follows no apparent set of rules. The small, black images are about the same size as capital letters in the text and are interjected literally between words in running text. The icons appear frequently in some sections of text and not at all in other sections of text. Icons also appear in the several timelines which are used throughout the exhibit. The icons sometimes appear to mean something and at other times they are totally incongruent with the text. The reader is frequently left wondering why a given word has an icon and another word does not have an icon. The icons in many places appear to disrupt the reader's thought process as he/she tries to figure out the meaning of the icons.

There are a number of strange juxtapositions of icons and text in the exhibit. One representative example follows some text in the contextual environment devoted to the Chinese Grave Guardian Beast. The text reads as follows:

> To make the earthly spirit comfortable, elaborate underground tombs were created with all the furnishings that one would have in this world. In this way, a spirit would never want to leave the tomb and cause trouble for the family of the person who had died.

This icon appears to be a coffee pot. (!) There is no discernible relationship between a coffee pot and early Chines tomb furnishings made explicit in this contextual environment. If there

is a meaningful relationship here based upon historical traditions, it appears safe to say that most *children* would not be able to determine the meaning of the icon.

Other inserted icons are disruptive not only because they lack a discernible relationship with the text, but also because they are signs in our culture, i.e., they have conventional meanings incongruent with the passage where they appear. For example:

> It is only in recent years that scholars have learned how to read the complex Mayan hieroglyphs. Even when the stone was carved, most Mayans could not read it. . . .

The arrow implies directionality; it means "look in this direction." Inserting this sign to look away must surely be disruptive to someone reading a line of text, especially if the reader were a novice.

There is also the repeated use of one icon where it appears that the icon has several different meanings, some apparent and some not. Several examples of text and how this icon is used are presented below:

> New ideas and inventions came one after the other. People changed the way they thought about the world after Nicolas Copernicus wrote a book that proved that the earth revolved around the sun. . . .
>
> . . . This public record of a king's family history told everyone that the ruler had a right to serve as a link with the gods.
>
> African carvers generally choose soft young wood for masks because it is lighter for the wearer and easier to carve. They carefully choose the tree to be used and make offerings to the nature spirits that the Bwa believe inhabit trees, rocks, and water. . . .

This icon (a dot with concentric circles) appears to be a solar system which at least bears some relationship to the first passage where it appears. However, its meaning in the other two passages is not clear at all. Cognitive psychology tells us that readers cannot help but try to make meaning out of this confusing image in this context. It is difficult to imagine that such confusion could be considered "fun." One is reminded here of the principles that suggest that the effect of humor in an instructional message is unpredictable.

Identification Game in *Grave Guardian Beast* Environment

In the contextual environment which accompanies the exhibit's Chinese Grave Guardian Beast, there are two glass-covered cases set into the wall. In each case there are several cardboard, cut-out figures which represent camels, horses, court members, and hunters. These are "interactive" identification games. Each case has two questions and two buttons to push to reveal the answers to the questions. These figures, which look like poor Xerox copies which have been enlarged and mounted on foam board, include excessive detail, making it difficult to see their criterial attributes. Principles regarding cueing, visual contrast, and light levels are violated in their rendering and presentation. Only one of the figures was described in the text of the exhibit; for the other three figures, the visitor must rely on the text of the question and his/her ability to decipher what the figures depict to be

able to answer the questions. An example question would be:

> **Clue:** Hunting is my favorite pastime. I always hunt with my specially trained bird, a falcon. Who am I?

After guessing or figuring out which is the figure which is holding a bird (the only clue), the visitor should press the button under the question to reveal the answer. The rendition of the figures is so poor that it is difficult to see which figure is holding a bird. The answer is revealed by a light which comes on under the correct figure. This is the level of interactivity in much of the exhibit, with the exception of the art-related computer games which will be discussed later. Answers to the questions asked either rely on superficial characteristics of the objects, requiring no problem solving and no inference, or they rely on prerequisite information that most visitors do not have in their existing schemata. In other words, the questions are either too easy or too hard. This circumstance violates principles suggesting that attention and motivation are best maintained when complexity is at a moderate level – challenging, but doable. This game also represents the significance level of much of the content in the exhibit's text overall. No exposition of the meaning, importance, or frequency of falconry in China is given in this environment. This activity is meant to provide context to the Grave Guardian Beast which is displayed at the entrance of this contextual environment; however, the only apparent connection is things Chinese.

Video Presentation in *Butterfly Mask* Environment

The contextual environment for the Butterfly Mask contains text about the use of masks among the Bwa people of Africa where this mask originated. There is also a display of masks from countries around the world and text about the use of masks in some of the cultures represented. There is a stylized reproduction of a butterfly mask and the type of costume that might have been worn with this type of mask. In addition, there is a brief video shown continuously in the environment, which depicts the type of festival where the mask might have been worn and the dancing which might have been performed when the mask was worn in such a festival. (The original Bwa mask is nearly 100 years old; the video was taken in recent times by Christopher Roy of the University of Iowa.)

This display of the mask, the text describing the mask's role in Bwa culture, the stylized reproduction, and the video are all intended to honor cultural diversity which was one of the goals for the exhibit and the artifacts chosen for inclusion. The issue here is what message is conveyed to the exhibit's visitors -- those who tour the exhibit superficially and those who read all the text and watch the video tape. The text and Christopher Roy, the videographer, explain that the Bwa people wear these masks and dance in a frenzy in something of a fertility rite to increase the chance of having a good harvest. Dr. Roy and the curator are both interested in conveying a sensitive picture of the Bwa people.

However, it is questionable that this is accomplished in this exhibit. The problem here is what communication theorists call "framing," i.e., the tendency for humans to interpret stimulation in terms of their previous experiences. This process is closely related to the principles governing perceptual organization and response set. Most visitors to the exhibit do not believe that masks and dancing will help to bring about an improved harvest. There is a chance that they will perceive the Bwa as "silly." More superficially, they may associate the frenzied movements of the dancers with child-like behavior at best and with mental disturbance at worst. It is questionable that enough context could be provided in this exhibit to allow naive visitors to reframe their perceptions of this video. The tragedy here is

that the exhibit designers may have unintentionally confirmed prejudices that some visitors have about the value of African cultures.

Art-Related Computer Games

Near the front of the exhibition space, there are three computer stations. These computers each offer the same games and other activities. The games and activities are meant to provide additional context for the six artifacts in the original exhibit that were not contextualized with environments. These computer stations are fairly sophisticated. They are equipped with touch screens which allow players to access all parts of the games – there is not a keyboard or mouse in sight. The games which operate on these computers utilize brilliant color, animation, fading, and sound, and the player has the ability to move or drag various images around the screen during some of the games. For the most part, the programming is competent, but the content is quite limited. These machines could do much more if the games' design had been more sophisticated or perhaps was overtly instructional.

There are eight different games on each computer, as well as, "visits" to several artists' studios, and a look at three additional paintings. The computer games make more use of the technology, while the two activities are basically slide shows. The computer games allow players to create a mock-up of a ceramic dish, play a decorative arts matching game, go on a treasure hunt, remember the colors in a painting, change the color scheme of a painting, construct a sculpture from a collection of scrap metal, deconstruct a sculpture and reconstruct it, and play "brushstroke detective," a game that allows matching of paintings by identification of brushstroke technique. An explanation of two of these games will serve to illustrate the sophistication of the games and their utilization of the technology.

In the Brushstroke Detective game, the players are given sections of four paintings and four smaller circular portions of these same paintings. The instructions tell the players to match the circular portions to the larger sections of the paintings by noting the type of brushstrokes used in each painting and the circular sections. The player then drags the circular section to the larger portion of the painting by placing his/her finger on the screen and dragging the circle to where it fits into the larger part of the painting. If the circle is "released" in the correct position, the computer reveals the entire painting to the game player.

The major flaw in the conceptualization of this game is that the brushstrokes are not the most apparent characteristic of the illustrations given. Frequently, the more salient characteristics are color and pattern. The learner cues on these characteristics rather than the type of brushstrokes that were used, thus circumventing the objective of the game. The designers of the game have done a poor job of identifying the cognitive processes actually required by the game. Therefore, the objective of the game and the process of playing it are misaligned.

Another of the games is described as a "decorative arts matching game." In this game, the player is given a picture of a small portion of some decorative arts object and the choice of "matching" this picture with the names of four decorative arts objects: bowl, clock, vase, or piano. The player makes the match by touching the name of the object which he/she thinks matches the small portion of the object depicted. There are always the same four names from which to choose.

The objective of this game is not to match, but to guess. The player has not previously

been given any information by the computer or in the overall exhibit about any of the decorative arts objects depicted in the game . Indeed there is even very little information contained in the small pictures from which one might make an educated guess. This experience is very likely not to be a rewarding one for the visitor. They are set up to fail at this matching task. Here again the game designers seem to have done a poor job of analyzing both the cognitive processes required by the game and the prerequisite knowledge required to play it. Therefore, the game does little to add understanding or appreciation of the larger exhibit.

Representative Contextual Environment: *The Adoration of the Magi*

In order to describe how several of these components are integrated in a single contextual environment, selected elements in the environment for the painting *The Adoration of the Magi* is examined and criticized in some detail below.

Original Painting and Labels

The painting *The Adoration of the Magi* is hung in the "Inside" gallery section of the exhibit *Art Inside Out*. The painting is accompanied by two labels. The first is a typical art museum label which gives the title of the painting, the artist, the medium (tempera on panel), geographic origin (Italy), approximate date of its creation, and the persons donating the work and the accession date. This first label reads as follows:

> **THE ADORATION OF THE MAGI**
>
> Attributed to Raffaelo Botticini
> Tempera on panel
> Italy, c. 1490
>
> Mr. and Mrs. Martin A. Ryerson Collection, 1937.997

The second label, which asks four questions, is directed at a cognitive level for very young visitors / learners. This second label asks the reader:

> Find the three crowns of the three Magi.
>
> How many different animals can you find/
> How many people?
>
> Do you hear any music at this event?
> What kind?

This type of label is not typically found in art museums. This label is an attempt to make this exhibit communicate more with its visitors, particularly to stimulate conversation between children and parents, docents, or teachers. However, finding crowns, counting people or animals, or identifying that someone in a painting is playing a musical instrument would pose a challenge for only the youngest visitors, perhaps first, second or third graders. However, the labels also pose a problem for such visitors in that it asks the visitor to "find the three crowns of the three Magi." For young visitors, "Magi" would be a problematic word, particularly if the child was not of the Christian faith. It should be noted that diversity is not being addressed well when those of a non-Christian background – those not familiar with the term Magi - are excluded. This insensitivity to those not of the Christian faith is demonstrated in several places in this environment. Here again we see questions that are at once too easy and too hard, both superficial and demanding prerequisite information not available to many if not most young visitors. Failures of both learner analysis and task analysis are evidenced in these questions.

In the contextual environment which accompanies this painting there are several individual components, including a "viewer" and a model, two exhibit cases set into a wall, a timeline and two maps and a "big book" discussing the iconography of the painting.

The "Viewer" and the Three-Dimensional Model

As one enters the contextual environment adjacent to *The Adoration of the Magi*, there is a "viewer" consisting of a partition which holds a line drawing on acetate and an eyepiece on metal supports centered in front of the drawing. When the visitor enters this contextual environment and stands in front of this viewer, they are in one corner of what is basically a rectangular room approximately 12 by 18 feet. The viewer is designed to look from the entrance corner of the environment to the opposite corner of the room at a three-dimensional (3D) model of what might be street scene in a Renaissance city – with palatial buildings lining both sides of a street and a triumphal arch astride the center of the street to the rear of the scene. The model is quite large, and it is set into a frame which measures approximately five by eight feet. The 2D line drawing mentioned above is of this street scene and is approximately 8 inches by twelve inches. The metal supports hold the eyepiece approximately nine inches from this drawing. The eyepiece of the viewer is located at the assumed eye-level of the "generic child" in this child-friendly exhibit. For many children, the eyepiece is too high and for others it is too low.

The object of this arrangement is to look through the eyepiece and align the 2D line drawing with the 3D model located approximately 7 feet in front of the viewer. It must be assumed that the model was intended to demonstrate the artist's technique of one-point perspective. A lack of specified objectives or explanatory text does not help clarify the purpose of the model for the visitor; however, the text on the front of the viewer directs the viewer to find the vanishing point – a term used in one-point perspective drawing.

The purpose of the viewer is not very well realized; the nature of the human eye prevents the perfect meshing of these two "images." The eye cannot focus on the plane of the drawing (nine inches away) and the "plane" (volume / depth) of the model (seven feet away) at the same time. Further, there is no connection made between the viewer and the use of perspective in *The Adoration*. The scene in the model and drawing is similar to those depicted in a number of Renaissance paintings, but it is not at all similar to the architectural scene depicted in *The Adoration*. And, while the use of perspective does play a

major role in the painting, it certainly is not the best choice of paintings if one wishes to show an example to teach about perspective.

There is text on the side of the viewer you face as you enter the environment and additional text on the reverse side. This viewer, and the model in particular, attract a great deal of visitor attention. As the curator has noted, the model is very attractive to visitors to the exhibit. The model also represents a major commitment in time and resources for its design, construction and installation. The viewer and model section of this contextual environment succeeds on the level of attractiveness, size, and its ability to generate visitor interest. However, it is a failure and overall negative aspect of the exhibit due to problems with the theoretical basis for using this 3D model.

The use of one-point perspective allows the illusion of three dimensions while depicting them in two dimensions. A typical example of this type of illusion is that railroad tracks appear to meet in the distance, when in reality they are parallel. In this exhibit, the model depicts, *in three dimensions*, how a street scene appears to come together in the distance. This is accomplished by using what might be termed "3D perspective" or "sculptural" perspective. The effect is achieved by distorting the shapes of the buildings and the plane of the ground in the model, i.e., by having the plane of the ground in the model rise as it recedes and the buildings get smaller and closer together as they "move" toward the rear and center of the model. Thus the visitor is asked to compare a 2D drawing - using one-point perspective - with a 3D perspective model (a model using "sculptural" perspective). *These two forms of perspective are not analogous.* What this actually "says" is that the railroad tracks (or the curbs of a city street) really do come together in the distance – that railroad tracks are *not* parallel. This is, of course, highly confusing. This confusion is, however, "modified" by the fact that the purpose and explanation of the model are so poorly presented that the discrepancy is not perceived by most visitors – they do not understand, but only see the attractiveness of the model. The seriousness of this error on the part of the exhibit cannot be underestimated.

The fundamental error of the viewer/model is difficult to explain in a few words. However, once the mistake in the theoretical grounding of this configuration of 2D and 3D images is conceptualized, the seriousness of the error becomes apparent. The implications for what is communicated to the visitor, the waste of resources, and the loss of opportunity that results from this error are made clear. This viewer/model configuration gives the visitor an attractive, but highly confusing, i.e., wrong, explanation of perspective. Even if this confusion only operates at a subconscious level, the visitor is less likely to want to return to the museum. Confusing messages violate recently articulated principles of maintaining motivation; humans are motivated to attend to information that is challenging, but not incoherent or internally irreconcilable.

Wall-Mounted Display Case About Egg Tempera Paint

If a visitor continued to proceed around the contextual environment in a clockwise fashion, they would next encounter a wall-mounted display case (set into the wall) which addresses the egg tempera paint used by Botticini to paint *The Adoration*. This display case contains both text and artifacts, i.e., objects and materials which illustrate the text. There are a number of problems with the text and the information it presents. As with other portions of the exhibit, there is no connection (delineation of objectives) drawn between *The Adoration* and this exhibit case. The visitor is left *to assume* that this case seeks to "explain" the tempera paint utilized in the painting. The visitor would have had to draw

this inference from the phrase "tempera on panel" from the gallery-like label which accompanies the painting in the "inside" gallery portion of the exhibit. This, of course, assumes the visitor read the label. (Many gallery visitors do not read labels due to their small size and the dearth of information they give – and possibly because the labels are confusing.) Observations of visitors to the exhibit reveal that many visitors do not read the labels which accompany *The Adoration*.

A major problem with this display case is the text is poorly written and not particularly accurate. For example, the statement, "A layer of rabbit skin glue and chalk gesso, a plaster of paris [*sic*] mixture [*sic*] are applied to prevent the wood from deteriorating," is fraught with problems. Of course, the word "paris" should be capitalized. It also appears that this sentence is jumbled. Perhaps the curator intended to say, "Renaissance painters painted on wood. A layer of chalk gesso (a mixture of rabbit skin glue and plaster of Paris) was applied to prevent the wood surface from deteriorating." As the text was originally written, a novice visitor might find themselves asking "What wood?" Even if the visitor read the label on the original painting and recalled the wording on the label, the label says "panel," not "wood." Furthermore, even if the sentence is clarified and "unjumbled" for the visitor, the novice is misinformed. The purpose of gesso is not to protect the wood, but to provide a smooth white surface on which the tempera paint might be applied.

Overall, this wall display case is confusing. It had the potential to explain an important element (tempera paint) in the creation of *The Adoration*. The important potential of the display case is particularly undermined by the lack of a clear connection between the tempera paint medium and the painting, *The Adoration of the Magi*, which is the "excuse" for the introduction of the topic of tempera paint into this contextual environment. The text in the display case violates principles regarding the use of standard, correct English as well as principles of structured text suggesting continuity in terminology.

Time Line

Proceeding around the room, the visitor would encounter a time line. A similar but somewhat more extensive time line was also part of the introductory section for the entire exhibit. However, the time line in this contextual environment has a section of the "line" colored in brown, 900 to 1900 AD. There appears to be no logical, discernible reason why this block of time is highlighted in color. Perhaps it would have made sense to highlight the period of time which is generally considered to encompass the Renaissance. The time line uses color as a cueing device – a good perceptual strategy – but focuses the visitor's attention on a time period that does not represent the Renaissance.

This time line (and the six other time lines in the rest of the exhibit) lists a number of historical "happenings" and their associated dates. Some of these historical happenings are accompanied by an icon which might be associated with the historical happening it accompanies; however, some of these icons are indecipherable. The text used in the time line is crowded and suffers from a lack of good text design; the information included for the entries on the time line is inconsistent and its placement varies from entry to entry. . Very few visitors have been observed to spend a significant or even a small amount of time viewing the time line in this environment (or those elsewhere in the exhibit). This may be due in part because these significant historical happenings are not explained or related, except by chronology, to *The Adoration* and because the time line overloads perceptual capacity.

Recommendations for Improving Museum Exhibit Development Practices

While the principles discussed in this case study are generally accepted by instructional designers, they run counter to the thinking of and are not a part of the knowledge base of many museum professionals. For example, providing guidance for the visitor through the exhibit would be counter to the expressed beliefs of the exhibit's curator. In an interview she stated, "An exhibition in a museum is different from say a course in a classroom. If you are teaching a class and you've got their 100% attention for an hour or whatever you get, and you have specific goals and objectives and a lesson plan. An exhibition is a larger kind of entity and people approach it differently. And you might say you would number things, but I really wouldn't want to restrict a visitor. I would not want to do an exhibit where I numbered and gave people a specific path. I think that it's [an exhibit] a more complex process and that learning can take place. I guess I don't feel that I really want to have that kind of set goals; it's too narrow."

The authors of this case study obviously disagree. We are inclined to believe that museum professionals have ignored fundamental human information processing principles having to do with perception, framing, prerequisite knowledge, short term memory, drawing inferences, and in general, making meaning. They would be well advised to master instructional design principles as well as to adopt instructional development processes to increase the likelihood that critical steps such as envisioning outcomes, learner analysis, task analysis, message design, and formative evaluation are well carried out.

The following recommendations will provide excellent guidelines for the improvement of the exhibit development process at the Art Institute and museums in general. These recommendations address systemic problems in the exhibit development process at the Art Institute. The implementation of these recommendations will improve the overall educational value of exhibits developed in the future.

Each time a new exhibit is created, it should have broad, general goals to guide its development. From these goals, specific, detailed, precise, behavioral objectives should be written. These objectives should be re-written, added to, modified, expanded, deleted, as necessary, throughout the exhibit development process. Formative evaluation (as well as, the other concepts and principles of instructional development) should be utilized to create exhibits. Exhibits should be evaluated in a mock-up stage before exhibit elements and total overall design is finalized. Problems discovered should be corrected, and the exhibit should be evaluated again. When an exhibit is completed and on display, it should be evaluated and information learned should provide feedback to improve the exhibit evaluated and to "inform" the exhibit development process in the future. It should be noted that the objectives are what permit and drive a meaningful evaluation process – an evaluation process that yields evidence about the educational success of an exhibit and information which would improve future exhibits and the skills of the exhibit development team. For the optimum utilization of the feedback provided from the evaluation of an exhibit, the information gathered must be considered/utilized/reflected upon through the lens of a research-based, instructional design schema or construct.

Artifacts and works of art utilized in an exhibit should be chosen for their ability to convey the objectives of the exhibit. Use of the "best" or "most famous" object or work of art does not always best facilitate the exhibit's attainment of its objectives. For example,

Botticini's *The Adoration of the Magi* might not be the best choice if a curator wanted to illustrate perspective.

Instructional message design should be utilized to facilitate communication. The decorative or "fun" impulses of graphic artists should be resisted. Only decoration that does not interfere with communication should be allowed. Graphic artists working in educational settings should master the principles of instructional message design. When instructional message design is utilized to create effective communication, there is still much creative work to be done to make an exhibit, and the included text, attractive.

Spelling, punctuation, and grammar, should be correctly used. This is especially true when designing exhibits for children; the exhibit should model correct English. It would seem wise to hire professional proofreaders for precision in this matter. *This is not a call for an editor* who might be tempted to change the text – thereby altering the meaning intended by the instructional designer/exhibit developer/curator.

Unless a very specific audience is the reason for an exhibit or program, accommodations to one specific audience that limits the access of a number of other audiences should not be made. In the case of Art Inside Out, the "child-friendly" elements made the exhibit less accessible for small or large children and adults. Instead, strategies that would make an exhibit accessible to everyone, or the greatest number of visitors possible, should be utilized. During the summer months when school groups do not visit the museum regularly, observations of visitors to the *Art Inside Out* exhibit indicate that the majority of visitors to the exhibit are adults. This is unfortunate since a number of aspects of the exhibit are geared to the height of a small child.

Instructional message design should be mastered by museum exhibit designers. Without these principles, the exhibit developer only knows something is wrong and does not necessarily know why *unless* this knowledge is related to a theoretical framework or schema. If this theoretical framework is not present as an "exhibit development" schema, the curator is likely to repeat the same types of mistakes over and over again in different exhibits. They may never realize that they are making similar mistakes which violate the same instructional principles because the mistakes are in a completely different context.

Incorporate instructional design principles into all facets of museum education, including exhibits, programs, teacher workshops, and materials for teachers. For educationally effective exhibits and programs, it must be recognized that some members of the exhibit development staff must possess knowledge and skills in instructional design – skills which are more important than subject mater expertise skills in art history or fine arts.

References

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